

REMARKS

Claims 1-20 are pending in the application. All the pending claims stand rejected. By the foregoing amendment, the Applicants have amended claims 1, 10 and 14. No new matter is added by the amendments. In view of the following discussion, Applicants submit that all pending claims are in condition for allowance.

Claim Rejections**35 U.S.C. § 102**

In the Office Action on page 2, paragraph 1, claims 1, 5, 10, and 14-15 were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,855,801 to Lin et al. ("Lin"). The Examiner stated:

Lin teaches a microheater for microfluidic devices comprising a microchannel 78 formed on a silicon substrate-wafer 46, and a conductor pads 36 formed in the microchannel 78, the microheater is formed from heating resistors 60 (col. 3, lines 20-67, col. 4, lines 1-10 and Fig. 1). As for claim 14, Lin meets all limitations of the claim including patterning of the substrate-wafer 46 (Col. 4, lines 21-67). As for claim 15, Lin teaches etching of the substrate 46 with a boron-doped region 52 (col. 4, lines 6-67).

Applicants respectfully traverse this rejection.

Claim 1 as amended recites: A microheater for microfluidic devices comprising at least one microchannel having a length formed on a substrate and further comprising at least one conductor disposed in said microchannel along a majority of the length of said microchannel. Claim 10 as amended recites: A microfluidic device comprising at least one microchannel, said microchannel further comprising a microheater, said microheater comprising at least one continuous conductor layer formed in a majority of a length of said microchannel. Claim 14 as amended recites: A method for fabricating a microheater for a microfluidic device comprising the steps of: providing a substrate; patterning said substrate; forming at least one microchannel in said substrate; and forming at least one conductor in a majority of a length of said at least one microchannel.

Each of independent claims 1, 10 and 14 as amended require the presence or formation of a microheater or microheater device in a microchannel along a majority of a length of the microchannel.

The Lin reference neither discloses nor suggests a microchannel having disposed therein a microheater or microheater device that is disposed along a majority of a length of a microchannel. The only microheater in the Lin reference is formed from a plurality of individual resistors perpendicular to the microchannel and is located only in microflow channel 78 at the interface region 11 of the microneedle 10. There is no microheater or means to achieve microheating located in the remaining majority portion of the microflow channel 78. In contrast, the presently claimed invention includes a microheater that extends through at least a majority of the microchannel. As a result, the Lin reference does not contain each and every limitation of independent claims 1, 10 and 14 as amended. Therefore, it cannot anticipate these claims. Claims 5 and 15 depend from independent claims 1 and 14 respectively and recite additional features therefore. Thus, these dependent claims are also not anticipated and are allowable. Accordingly, applicants respectfully request this rejection be withdrawn.

In the Office Action on page 2, paragraph 3, claims 1-2, 5-6, 9-11, 13-14 and 18-20 were rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Published Patent Application No. 2004/0062468 to Lee ("Lee").

Applicants respectfully traverse this rejection. Lee is not prior art to the present application. Lee was published April 1, 2004 and filed September 10, 2003, claiming the benefit of Taiwanese Application No. 091122673 filed October 1, 2002. Because the present application claims priority to U.S. Provisional Patent Application No. 60/433,184 filed December 13, 2002, which provides support for the invention as claimed, and the Lee reference only qualifies as prior art as of its earliest publication date which to our knowledge is April 1, 2004, the date of the United States publication, this reference is not prior art to the present application. Accordingly, applicants respectfully request this rejection be withdrawn.

35 U.S.C. § 103 – Claims 6-7 and 12 (Lin in view of Ferguson)

In the Office Action on page 3, paragraph 4, claims 6-7 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Linn in view of U.S. Published Patent Application No. 2003/0209534 to Ferguson (“Ferguson”). Applicants respectfully traverse this rejection. Independent claim 1 as amended, from which claims 6 and 7 depend, has been recited hereinabove. Likewise, independent claim 10 as amended, from which claim 12 depends, has been recited hereinabove. Applicants submit that neither Lin nor Ferguson, alone or in combination, teach or suggest the present invention as claimed. Moreover, applicants submit there would have been no motivation to combine the references, and even if such combination were made, the claimed invention would not result therefrom.

The Lin reference relates to a micromachined needle having an interface region 11 and elongated shaft portion 14 and enclosed microchannel 78 disposed along the length of the interface region 11 and shaft portion 14. The enclosed microchannel 78 includes a microheater 60 only in the interface region 11 and specifically does not include any heating device in the shaft region. See, e.g., FIG 1A. Since the Lin reference does not disclose, teach or suggest a microheater disposed in a microchannel along a majority of the length of the microchannel as claimed in independent claims 1 and 10, the teachings of the Lin reference would not motivate one skilled in the art to look to Ferguson to achieve the presently claimed invention.

The shortcomings of the Lin reference have been set forth in detail. Nothing in Ferguson even remotely suggests the use or disposal of a microheater in a majority of a length of a microchannel. Accordingly, Ferguson does not remedy the deficiency in the Lin reference.

The combination of the teachings of Lin and Ferguson result in a microheater disposed only in an interface region of a microneedle having a substrate comprising quartz and borosilicate glass. That combination is not the claimed invention of the applicants.

Based on the foregoing, the applicants submit the subject claims are not obvious in view of the cited references. Accordingly, applicants respectfully request this rejection be withdrawn.

35 U.S.C. § 103 – Claims 3 (Lee); Claims 4 and 8 (Lee in view of Yamazaki and further in view of Ueno et al.)

On pages 3-4 of the Office Action, paragraph 4-7, claims 3 and 4 and 8 were rejected under 35 U.S.C. § 103(a) as being unpatentable of Lee (Claim 3) and Lee in view of Yamazaki (Claims 4 and 8 under 35 U.S.C. § 103. The Lee reference as discussed hereinabove is not prior art. Accordingly, applicants respectfully request these rejections be withdrawn.

35 U.S.C. § 103 – Claims 16 and 17 (Lin or Lee in view of Yamazaki)

On page 4 of the Office Action, paragraph 8, claims 16-17 were rejected under 35 U.S.C. § 103(a) as being unpatentable based on Lin or Lee in view of Yamazaki under 35 U.S.C. § 103(a) based on the premise the Lin or Lee reference “disclose substantially the claimed invention.” Applicants respectfully traverse this rejection. Claims 16 and 17 depend from amended independent claim 14. As set forth in detail hereinabove, the Lee reference is not prior art, therefore the rejection should be withdrawn as to Lee. As also set forth in detail hereinabove, the Lin reference does not disclose the invention of amended claim 14 which requires a microheater device in a microchannel along a majority of a length of the microchannel. The teachings of Yamazaki cannot cure the deficiencies of the Lin reference to achieve the invention of claims 16 and 17. The combination of Lin and Yamazaki at best result in a microneedle device having an enclosed microchannel with a boron ion-implanted microheater only in the interface region and specifically does not include any heating device in the shaft region. This is not the invention of claims 16 and 17. Accordingly, applicants respectfully request this rejection be withdrawn.

Applicants submit that all claims pending in the patent application are in condition for allowance. Accordingly, both reconsideration of this application and its swift passage to issuance are earnestly solicited. In the event there are any fees due and owing in connection with this matter, please charge same to our Deposit Account No. 11-0223.

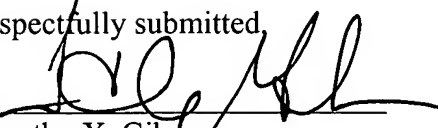
Application No. 10/735,989

Attorney Docket No. 436/12

Dated: November 18, 2005

Respectfully submitted,

By



Timothy X. Gibson

Registration No.: 40,618

KAPLAN GILMAN

GIBSON & DERNIER, LLP

900 Route 9 North

Woodbridge, New Jersey 07095

(732) 634-7634

Attorneys for Applicant

G:\Clients\New Jersey Institute of Technology-436\436-12\436-12 Amendment to 09-07-05 OA.doc